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DATE: 09/18/08 FILE NUMBER: KPT 1101
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Applicant's Name: David M. Sutton et al.

Serial No.: 10/577,374 Examiner: Y. Valenrod

Filing Date: 01/23/07 Art Unit: 1621 Confirmation No.: 6215

Application Title: Process for the Production of Esters of Mono-, Di-, or Polycarboxylic Acids

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KPT 1101
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of David M. Sutton et al. Art Unit 1621
Serial No. 10/577,374
Filed January 23, 2007
Confirmation No. 6215
For PROCESS FOR THE PRODUCTION OF ESTERS OF MONO-, DI- OR POLYCARBOXYLIC ACIDS
Examiner Yevgeny Valenrod

September 18, 2008

REQUEST FOR REFUND

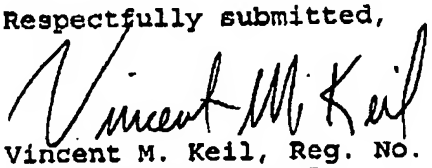
TO THE DIRECTOR OF THE U.S. PATENT AND TRADEMARK OFFICE,

SIR/MADAM:

Applicants hereby request a refund of $1,050 for the three month extension of time fee which was erroneously charged to Deposit Account No. 19-1345 for response to the Non-Final Office action filed on June 10, 2008. Attached is a copy of the Non-Final Office action dated December 12, 2007, which set out the statutory response period as "6 month(s) or thirty (30) days, whichever is longer, from the mailing date of this communication." Applicants submit that Amendment B, filed on June 10, 2008 in response to the Office action was timely filed and that no extension of time under provisions of 37 CFR 1.136(a) or fee are required.

The requested refund may be made directly to Deposit Account No. 19-1345.

Respectfully submitted,



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,374	01/23/2007	David M. Sutton	KPT 1101	6215

321 7590 12/12/2007

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EXAMINER	
VALENROD, YEVGENY	

ART UNIT	PAPER NUMBER
1621	

NOTIFICATION DATE	DELIVERY MODE
12/12/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspatents@senniger.com

PTOL-90A (Rev. 04/07)

Office Action Summary	Application No.	Applicant(s)	
	10/577,374	SUTTON ET AL.	
	Examiner	Art Unit	
	Yevgeny Valenrod	1621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 6 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 10 July 2007.

2a)☐ This action is FINAL. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-22 is/are pending in the application.

4a) Of the above claim(s) ____ is/are withdrawn from consideration.

5)☐ Claim(s) ____ is/are allowed.

6)☒ Claim(s) 1-22 is/are rejected.

7)☒ Claim(s) 4-22 is/are objected to.

8)☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 28 April 2006 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. ____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 7/10/07.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. ____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: ____.

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DETAILED ACTION

Claim Objections

Claims 4-22 are objected to under 37 CFR 1.75(c) as being in improper form because multiple dependent claims 4-8, 10, 12-16 and 18-21 depend on multiple dependent claims and claims 9, 11, 17 and 22 depend on improper multiple dependent claims. See MPEP § 608.01(n).

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 11 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear where the heater is located.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4, 5, 10, 12, 16, 17, 20, 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Cooley et al. (US 4032458).

Cooley et al. disclose a continuous process for production of 1,4-butanediol by supplying maleic acid containing 56.45% water(Column 13, Example 1, lines 63-65) to an esterification zone comprising n-butanol where the butyl ester of maleic acid is produced. Cooley et al describe bringing the reaction mixture to reflux (column 13 line 61), which means that the mixture was heated. In order to advance this reversible reaction, water needs to be removed. Cooley et al. accomplish removal of water via distillation of water-butanol azeotrope (column 11, line 20-23, and Figure on the title page showing esterification/dehydration chamber 10 and stream 15). The produced ester is subjected to catalytic hydrogenation (column 11, line 61-column 12, line 6).

Claims 1, 2, 4, 5, 7, 8, 9, 10, 12, 20 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Schwartz et al. (GB 1,437,898).

Schwartz et al disclose a continuous 2-stage process for preparation of a diester of maleic acid. The first stage comprises production of monoesters which are subsequently converted to diesters in the second stage (Example 1 on page 4). The maleic acid for the process is obtained via hydrolysis of maleic anhydride. Water content in the feed is above 50% (page 4, column 1, lines 33-37). Water and alcohol are removed from the esterification zone by azeotropic distillation (page 4, lines 4-7) and esterification zone is heated with an aid of a heater (page 4, lines 89-90).

Claims 1, 4, 6, 10, 12, 13 and 15 are rejected under 35 U.S.C. 102(a) as being anticipated by Cockrem et al. (US 5,210,296).

Cockrem et al. disclose a method for producing high purity lactate ester by supplying concentrated fermentation broth (since it is concentrated, some of the water was removed prior to esterification process), adding butanol and sulfuric acid (liquid acid catalyst), heating the reaction to while removing water as an azeotrope with butanol and recovering the ester product (see columns 11-12, Example 1).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1- 5, 10-12, and 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cooley et al. (US 4,032,458) in view of Turner et al (US 4,751,334)

Scope of prior art

Cooley et al. disclose a continuous process for production of 1,4-butanediol by supplying maleic acid containing 56.45% water(Column 13, Example 1, lines 63-65) to an esterification zone comprising n-butanol where the butyl ester of maleic acid is produced. Cooley et al describe bringing the reaction mixture to reflux (column 13 line 61), which means that the mixture was heated. In order to advance this reversible reaction, water needs to be removed. Cooley et al. accomplish removal of water via distillation of water-butanol azeotrope (column 11, line 20-23, and Figure on the title page showing esterification/dehydration chamber 10 and stream 15). The produced ester is subjected to catalytic hydrogenation (column 11, line 61-column 12, line 6).

Ascertaining the difference

Cooley et al fail to teach:

a) Recycling of water to step (a) (claim 3).

b) Position of the heater for the esterification process (claim 11).

c) Vapor phase hydrogenation (claim 18).

d) Recycling of butanol recovered in the hydrogenation (claim 19).

Secondary reference

Turner et al. teach vapor phase hydrogenolysis of maleic acid esters to produce 1,4-butadiene.

Obviousness

Recycling of water:

One of ordinary skill in the art would be motivated to recycle water recovered from the esterification process into the esterification reactor. Doing so reduces the amount of water required for the process and has economic and environmental benefits. Applicant has not indicated any unexpected results arising from using water recovered in the process when compared to using water obtained elsewhere. Recycling of water to any part of the reactor that requires water is therefore obvious absent unexpected results.

Position of the heater in the esterification process:

One of ordinary skill in the art would be motivated to position the heater at any place on the esterification reactor where the heater will perform its designed function which is to heat the solution in the reactor. Since the process of Cooley et al. requires a distillation column for azeotropic removal of water-butanol, it is logical to place the heater on the bottom of the reactor where, which is where the reagents are introduces. Applicant has not provided unexpected results that arise as a result of specific heater position. Absent such results, limitation of claim11 is obvious in view of Cooley et al.

Vapor phase hydrogenation:

Turner et al teach vapor phase hydrogenation and hydrogenolysis of diethyl malonate to produce butane 1-,4-diol (column 1, lines11-16). They teach that their process provides a method of producing 1,4-butane-diol from the starting materials that are obtained from butane or benzene feedstock through maleic anhydridee. In view Cooley et al and Turner et al applicants' invention is obvious. There is no unexpected

result from using vapor phase hydrogenation. In fact Turner et al. describe their process as designed for the very purpose in which applicant uses it. Combining two methodologies where each one serves its intended purpose is obvious absent unexpected results.

In column 6, line 65 - column7, line 6, Cooley et al tech that the butanol used in the esterification need not be removed prior to hydrogenation of the esters. In hydrogenation butanol can serve as a solvent (although it is no necessary) and disperse heat that is generated by the exothermic hydrogenation process. On of ordinary skill in the art would find it obvious to recover the solvent after the hydrogenation process and reuse it in the esterification reaction. Motivation for recovery of butanol comes from environmental and economic concerns. Recovery of butanol is therefore obvious absent unexpected results.

Claims 1, 2, 4, 5, 7, 8, 9, 10, 12, 14, and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwartz et al. (GB 1,437,898) in view of Cockrem et al. (US 5,210,296).

Scope of prior art

Schwartz et al teach a continuous 2-stage process for preparation of a diester of maleic acid. The first stage comprises production of monoesters which are subsequently converted to diesters in the second stage (Example 1 on page 4). The maleic acid for the process is obtained via scrubbing of maleic anhydride with water

(page 1, lines 40-50). Water content in the feed is above 50% (page 4, column 1, lines 33-37). Water and alcohol are removed from the esterification zone by azeotropic distillation (page 4, lines 4-7) and esterification zone is heated with an aid of a heater (page 4, lines 89-90).

Ascertaining the difference

Schwartz et al fail to teach:

a) Recycling of water to the maleic anhydride scrubbing process (claim 22).

b) Use of catalyst in the second step of the process (claim 14).

Secondary reference

Cockrem et al teach a method for producing high purity lactate ester by supplying concentrated fermentation broth, adding butanol and sulfuric acid (liquid acid catalyst), heating the reaction to while removing water as an azeotrope with butanol and recovering the ester product (see columns 11-12, Example 1).

Obviousness

Recycling of water to the maleic anhydride scrubbing process:

Schwartz et al teach that maleic acid used in their invention is produced via scrubbing maleic anhydride with water in order to produce a crude aqueous solution of maleic acid (page 1, lines 45-50). One of ordinary skill in the art would find it obvious to recycle water that is recovered from production of diesters in order to utilize it in the production maleic acid. Doing so reduces the amount of water required for the process and is therefore more economical and environmentally friendly. Recycling of reagents is common in the art and is therefore obvious absent unexpected results.

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Use of catalyst in the second step of the esterification process:

Cockrem et al teach use of catalyst in esterification process. Catalysts are well known to lower the activation energy of the process and thereby increase production rate. One practicing the process of Schwartz et al. would find it obvious to use a catalyst in first or/and second step of esterification.

Conclusion

Claims 1-22 are pending.

Claims 1-22 are rejected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yevgeny Valenrod whose telephone number is 571-272-9049. The examiner can normally be reached on 8:30am-5:00pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yvonne Eyler can be reached on 571-272-0871. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Yevgeny Valenrod
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J. PARSA
PRIMARY EXAMINER

Yvonne Eyler
Supervisory Patent Examiner
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Notice of References Cited	Application/Control No. 10/577,374	Applicant(s)/Patent Under Reexamination SUTTON ET AL.	
	Examiner Yevgeny Valenrod	Art Unit 1621	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,210,298	05-1993	Cockrem et al.	562/589
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
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	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
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